

AI Planning

Exercise Sheet 11

Date: January 21, 2015
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Exercise 11.1

(a)

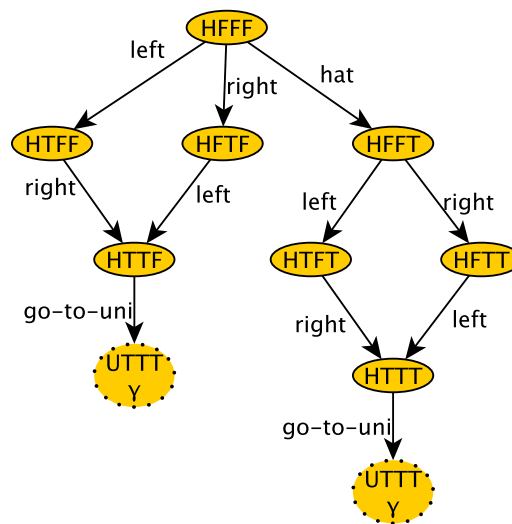


Figure 1: breadth-first search graph (with duplicate detection)

(b)

Exercise 11.2

Preliminaries

For every variable $v \in prevars(o)$ (Only for $o \in app(s)?$) we need to compute the Domain transition graph:

All given operators are "Active Operators" (see lecture 13, slide 14), because of

- For every variable $v \in prevars(o)$ there is a path in $DTG(v)$ from $s(v)$ to $pre(o)(v)$.
- If v is goal-related, then there is also a path from $pre(o)(v)$ to the goal value $\gamma(v)$.

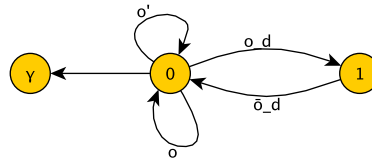


Figure 2: DTG(a)

Disjunctive Action Landmark:

$L = \{o, o'\}$ in initial state

Strong Stubborn Sets

1. Include o (or o') in T_S as disjunctive action landmark.
2. Include o_d in T_S since it interferes with o (o_d disables o)
3. Include o' (or o) in T_S since it interferes with o_d (o_d disables o')
4. Include $\overline{o_d}$ and o_i in T_S since both conflict with o_d
5. Include $\overline{o_i}$ in T_S since it conflicts with o_i

$T_S = \{o, o', o_d, \overline{o_d}, o_i, \overline{o_i}\}$

All six operators included in T_S , no pruning.

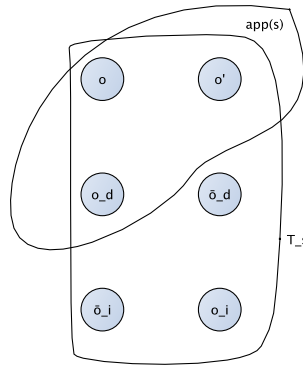


Figure 3: strongStubborn

Weak Stubborn Sets

1. Include o (or o') in T_S as disjunctive action landmark.
2. there are no operators in s that have conflicting effects with o or that are disabled by o

$T_S = \{o\}$

Nice amount of pruning.

Conclusion: Weak stubborn sets admit exponentially more pruning than strong stubborn sets.

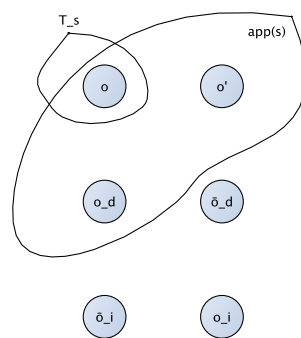


Figure 4: weakStubborn